IN THE CLAIMS:

1   1.-29.   (Cancelled)

1   30. (Currently Amended) A <u>system for</u> monitoring ~~device for use with~~ a household

2   electric appliance <u>being a washing machine</u>, the monitoring ~~device~~ <u>system</u> comprising:

        i.   3 a read and write memory storing a plurality of measurements of ~~at~~

    4 ~~least one~~ <u>a plurality of</u> physical ~~quantity~~ <u>quantities</u> relating to the

    5 household electric appliance within a predetermined time period

    6 during a treatment cycle~~,~~ the storing of a last measured value of ~~said~~

    7 ~~at least one~~ <u>a</u> physical quantity causing the deletion of a first

    8 measured value within said plurality of ~~values~~ <u>measurements</u> in the

    9 read and write memory;

        ii.   10 a first interface means to connect to one or more sensors for measuring

    11 said <u>plurality of</u> ~~at least one~~ physical ~~quantities~~ <u>quantity</u>~~s~~ of the household

    12 electric appliance<u>, including one or more internal sensors for</u>

    13 <u>measuring internal physical quantities and one or more external</u>

    14 <u>sensors for measuring external physical quantities;</u>

      iii.   15 <u>a dedicated communication network having a coupling to an external</u>

    16 <u>physical sensor, said network being coupled externally of the washing</u>

    17 <u>machine to the first interface means;</u>

    ~~iii.~~<u>iv.</u> 18 a means for measuring at least one electric quantity by measuring an

    19 electric current running through the monitoring device;

    ~~iv.~~<u>v.</u> 20 a storage means containing one or more predefined values of the at

    21 least one physical quantity;

    ~~v.~~<u>vi.</u> 22 a microcontroller to process a particular combination of at least one

    23 physical quantity and at least one electric quantity to determine an

    24 actual combination <u>of the internal physical quantities, one or more</u>

    25 <u>external physical quantities or both and one ore more electrical</u>

    26 <u>quantities</u> at an instant in time ~~of a particular set of physical and~~

27   ~~electrical quantities~~, the microcontroller being further configured to

28   compare ~~that particular~~said actual combination t~~o~~ one or more

29   respective predefined values contained in the ~~non-volatile~~

30   ~~memory~~storage means to determine at least one piece of information

31   each predefined value being a threshold value against which an actual

32   value is compared to determine a proper operation of a particular

33   component of the appliance at that instant in time; and

34   ~~vi.~~vii. a second interface means to send the at least one piece of information

35   to a remote center for storage.

1   31. (Currently Amended) The monitoring device as in claim 30, further comprising:

2   a wireless communication device within the first interface means, the wireless

3 communication device communicating with at least one internal sensor within the

4 household electric appliance where the at least one internal sensor measures a ~~second~~

5 physical quantity of an internal part of the household electric appliance; said wireless

6 communication device also adapted to function as the dedicated communication network

7 that couples the external sensors that sense the external physical quantities to said first

8 interface means, and further to report electrical measurements; and

9   the microcontroller being adapted to further process the measurements received

10 from the wireless communication device~~of the second physical quantity~~.

1   32. (Cancelled)

1   33. (Currently Amended) The monitoring device of claim 30, further comprising:

2   a timing unit, where the timing unit ~~allows an instant in~~determines time to be

3 associated with the measurements of the one or more physical quantities and at least one

4 electric quantity.

1   34. (Previously Presented) The monitoring device of claim 30, wherein the at least one

2 electrical quantity includes at least one of: momentary electric current drawn by the

household electric appliance, line voltage applied to the household electric appliance,

momentary electric power drawn by the household electric appliance, electric energy

consumption of the household electric appliance within a predefined time period, a power

factor of the load represented by the household electric appliance, cos(Φ) of the load

represented by the household electric appliance, and type of reactive power of the load

represented by the household electric appliance.

35. (Previously Presented) The monitoring device of claim 30, wherein the first interface

is connected to the one or more sensors through a wireless connection.

36. (Previously Presented) The monitoring device of claim 30, wherein the second

interface means is connected to the remote center through a wireless connection.

37. (Currently Amended) The monitoring device of ~~claim 30~~claim 41, wherein the

household electric appliance includes one of: a clothes dryer, a washing/drying machine,

a dishwasher, a refrigerator, a freezer, a refrigerator/freezer, an electric oven, a gas oven,

a microwave oven, a gas cooking top, an electric cooking top, a magnetic induction

cooking top, a kitchen hood, a conditioner, a gas boiler, an electric water heater, an air

conditioner, a hair dryer, an iron, a Hi-Fi system, a mixer or any other electric

kitchenware, a lighting device, an alarm device.

38. (Previously Presented) The monitoring device of claim 30, wherein said at least one

physical quantity includes at least one of: temperature, flow rate, conductivity, weight,

absolute humidity, relative humidity, pressure, linear displacement, linear velocity, linear

acceleration, angular displacement, angular velocity, angular acceleration, chemical

concentration, sound pressure, sound intensity, light intensity, oscillation frequency, and

oscillation amplitude.

39. (Previously Presented) The monitoring device of claim 30, further comprising:

an information storage means for storing the at least one piece of information in the read and write memory.

40. (Previously Presented) The monitoring device in claim 30, wherein the household electric appliance is one of a laundry washing machine and a washing/drying machine adapted to perform at least one wash treatment on textile items, said at least one physical quantitybeing preferably at least one of the following: weight of the textile items being present in the basket of the washing machine or the washing/drying machine, flow rate of water supplied to the washing machine or the washing/drying machine, temperature of washing liquid contained in a tub of the washing machine or the washing/drying machine, and conductivity of the washing liquid drained by the washing machine or the washing/drying machine, where the washing liquid comprises water and at least one washing agent.

41. (Currently Amended) A monitoring device for use with a household electric appliance, the monitoring device comprising:

  i.   a read and write memory storing a plurality of measurements of a ~~of at least one~~ plurality of internal physical quantit~~ies~~y, a plurality of external physical quantities and a plurality of electrical quantities that are related to the household electric appliance, said measurements being taken within a predetermined time period during a treatment cycle, the storing of a last measurement of ~~said at least one~~ a physical quantity causing the deletion of a first measurement of said ~~at least one~~ physical quantity;

  ii.   a first interface means to connect ~~to one or more external sensors~~ a dedicated external communications network to a plurality of external physical sensors, which measure external physical quantities, and further having means for coupling a plurality of ~~and one or more~~ internal physical ~~-~~sensors for measuring ~~said at least one~~ an internal physical quantity of the household electric appliance, where the one or more internal sensors are connected to the monitoring device by way

18   of an electronic control means and the first interface means;

19   iii.   a means for measuring at least one electric quantity by measuring an

20   electric current running through the monitoring device;

21   iv.   a microcontroller configured to:

22   a)   process measurements of a combination of ~~the~~ one or more internal

23   physical quantities, one or more external physical quantities, or both, and

24   ~~the at least~~ one or more -electric quantit~~ies~~y to determine at least one piece

25   of information relating to or being employed in said treatment cycle

26   during operation of the household electric appliance, where the at least one

27   piece of information includes at least one of: functional information,

28   statistical information, and diagnostic information relating to the

29   household electric appliance by comparing a value of said ~~at least one~~

30   physical quantity with one or more predefined values that relate to values

31   for the treatment being performed by the appliance at an instant in time;

32   and

33   b)   extrapolate from said plurality of measurements of said at least one

34   physical quantity a data packet representative of the evolution of said at

35   least one physical quantity within said predefined time period over one or

36   more treatment cycles; and

37   v.   an information storage means for storing the at least one piece of

38   information in the read and write memory.

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1 42. (Previously Presented) The monitoring device of claim 41, wherein the first interface

2 means is an electric cable to the one or more external sensors.

1 43. (Previously Presented) The monitoring device of claim 41, wherein the first interface

2 means is wirelessly connected to the communication means.

1 44. (Previously Presented) The monitoring device of claim 41, wherein the first interface

2 means is wirelessly connected to the one or more external sensors.

1   45. (Previously Presented) The monitoring device of claim 41, wherein the first interface

2   means is connected to the first communication means.

1   46. (Previously Presented) The monitoring device of claim 41, wherein the

2   communication means and the one or more internal sensors are connected through an

3   electronic control means, where the electronic control means collects, stores, and

4   processes the measurements from the at least one physical quantity from the one or more

5   internal sensors.

1   47. (Currently Amended) A system for monitoring a household electric appliance, the

2   system comprising:

3   a) a household electric appliance;

4   b) one or more external <u>physical</u> sensors to measure ~~one or more~~ <u>a plurality</u>

5   <u>of</u> ~~physical~~ external <u>physical</u> quantities of the household electric

6   appliance<u>;</u> ~~being external measurements~~;

7   <u>b) a dedicated communications network that is coupled to said external</u>

8   <u>physical sensors and is connected externally from said appliance to said</u>

9   <u>network which transfers information to an associated microcontroller via</u>

10   <u>the first interface means;</u>

11   ~~c)~~ <u></u>an electronic control means connected to one or more internal sensors,

12   where the one or more internal sensors measure one or more physical internal

13   quantities <u>or one or more electrical quantities</u> of the household electric

14   appliance, the electronic control means configured to collect, store, and

15   process measurements of the one or more <u>physical and electrical</u> internal

16   quantities being internal measurements;

17   ~~d)~~ <u></u>a communication means communicating with the electronic control means

18   to transfer ~~one or more of said external measurements and~~ one or more of said

19   internal measurements, over a predetermined time period to a first interface

20   means on a monitoring device;

21   ~~e)~~<u>c)</u>   the monitoring device including:

22   a.   a read and write memory storing a plurality of measurements of ~~at~~

23   ~~least one physical quantity~~ said plurality of external physical

24   quantities, a plurality of internal physical quantities and a plurality of

25   electrical quantities, within a predetermined time period, the storing of

26   a last measurement of said at least one ~~physical~~ quantity causing the

27   deletion of a first measurement of said ~~at least one physical~~ quantity~~;~~.

28   b.   the first interface means to connect to the one or more external sensors

29   and the communication means to receive the measurements of the one

30   or more physical external quantities and the one or more physical

31   internal quantities~~;~~

32   c.   a means for measuring at least one electric quantity by measuring an

33   electric current running through the monitoring device,

34   d.   a timing unit to associate an instant in time at which the measurements

35   of the one or more physical quantities and the at least one electric

36   quantity are taken,

37   e.   a microcontroller configured to:

38   (i)   process the measurements of the one or more physical

39   external quantities with one or more physical internal

40   quantities, and the at least one electric quantity, at the instant

41   in time, to determine sensed information relating to the

42   household electric appliance, where the sensed information

43   includes: functional information, statistical information, and

44   diagnostic information relating to the household electric

45   appliance, said sensed information being a combination of

46   values of at least one physical external quantity, physical

47   internal quantity and at least one electric quantity with a

48   reference combination of physical and electrical quantities

49   being the combination that best represents the proper

50   operation of the appliance at that instant in time, and

51   (ii)   collect information that allows the system to trace a history

52   of the monitored electric appliance that permits the

53   microprocessor to build in the read and write memory,

54   profiles being indicative of a trend within a predefined time

55   period of a particular physical quantity or typology of

56   information obtained by the microcontroller based upon

57   values detected by the sensors; and

58   f.   a second interface means to send the at least one piece of information

59   to a remote center; and

60   g.   the remote center configured to collect the at least one piece of

61   information from one or more monitoring devices connected to respective

62   household electric appliances and to extract statistical information about

63   the household electric appliances being monitored.

1   48. (Previously Presented) The system of claim 47, wherein the remote center receives a

2   plurality of information sent by the monitoring device that the remote center collects and

3   sorts for the purpose of identifying at least one parameter related to the operation of a

4   washing machine or a washing/drying machine, the at least one parameter being

5   preferably at least one of the following: number of wash treatments performed by the

6   washing machine or the washing/drying machine within a predefined time interval,

7   quantity and typology of textile items loaded on average by a user for each wash

8   treatment, quantity and typology of washing agents loaded on average by the user for

9   each wash treatment, average quantity of water used by the washing machine or the

10   washing/drying machine for each wash treatment, and average electric energy absorbed

11   by the washing machine or the washing/drying machine for each wash treatment.

1   49. (Cancelled)

1   50. (New) The system as defined in claim 30 wherein the external sensors include further

2   comprising:

3   a flow sensor positioned along an associated inlet pipe and adapted to measure

4   water flow rate supplied to the washing machine; and

5   a conductivity sensor positioned along a drain pipe adapted to measure the

6   conductivity of washing liquid drained from the washing machine.

1 51. (New) A system for monitoring a washing machine, comprising

2   a microcontroller configured to receive measurements from sensors associated

3 with the washing machine;

4   a flow sensor positioned along an associated inlet pipe externally to said washing

5 machine and adapted to measure water flow rate supplied to the washing machine;

6   a conductivity sensor positioned along a drain pipe adapted to measure the

7 conductivity of washing liquid as the liquid drains from the washing machine;

8   a dedicated communication network having a coupling to the flow sensor

9   and the conductivity sensor, said network being coupled externally of the

10   washing machine to the microcontroller; and

11   a read and write memory storing a plurality of measurements of at least one

12 physical quantity relating to the washing machine's operation, to provide a historical

13 analysis of the operation of the washing machine.